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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,353	03/12/2004	Tetsuya Kawagishi	250434US2SX	5604
22850	7590	12/14/2006	EXAMINER	
C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			JAWORSKI, FRANCIS J	
			ART UNIT	PAPER NUMBER
			3768	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/798,353	Applicant(s) KAWAGISHI ET AL	
	Examiner Jaworski Francis J.	Art Unit 3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 20 is/are pending in the application.
- 4a) Of the above claim(s) 9-17, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Claims 1 – 8 and 18 in the reply filed on 9/18/06 is acknowledged. The traversal is on the ground(s) that undue burden does not exist. This is not found persuasive because the Examiner has reviewed the subject content and notes that each alternative implementation must be weighed with respect to language particularizations regarding sub-harmonics (referenced to the highest transmit fundamental), sub-bands, infra-harmonics, non-integer harmonics, fractional or seed harmonics, intermodulation activities and also with respect to transmissions involving alterations in phase and/or amplitude and/or frequency between pulse transmissions for purposes of practicing phase inversion variants, and with respect to cumulative non-linearities (tissue harmonics) versus target non-linearities (microbubbles) as well as the relationship to broadband transmissions and Doppler harmonics such that what appear to be minor claims wording distinctions amongst the species and to all be indents under a largely contrast agent harmonic technology topic require in fact extensive consideration of waveform shaping disclosures unique to the particular claim wordings in an art where nearly all distinctions are drawn at the level of specification passage wordings as opposed.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

The drawings are objected to because

- a1) in Fig. 3B, Fig. 13 -- TRANSMISSION --.
- a2) Fig. 16C -- MEASURED --.
- b) Spec pages 21 – 22 bridging appear to suggest that the dotted line to the right in Fig. 3 be labeled f_2 in order that described legends be depicted.
- c) Fig. 4C appears to be mis-drawn as well as mis-labelled, albeit the geometry distortion is slight. That is, since the apparent intent is to show that by summing the returned harmonic of the first transmission frequency f of Fig. 4A and the returned difference frequency $f - f_2$ of Fig. 4B (where f_2 is about $2.8 \times f$), the result is a superposition whose center frequency is slightly downshifted below $2f$. Therefore the dotted line should be the exact center frequency of the solid line result and so the solid line would be downshifted with respect to the $2f$ marking, meaning that the increased width of the resulting solid line bandpass would represent as a broader skirt width on the downside of f_2 with the upside skirt width remaining the same as in Fig. 4A. Also, label " $f_2 - f$ " ? should appear in Fig. 4C.
- d) The center axis of 4B should be represented by " $f_2 - f$ ".

[Alternately stated, the Examiner is referencing Fig. Set {3,4A – 4C}} with Figure set {5 and 6A - 6C} which represent an equivalent alternative shift according to the respective descriptors to the right of the waveforms and democratically concluding that everywhere a legend appears within the latter drawings so should one appear in the former drawings. By this math Fig. 3 is short one legend wrt Fig. 5 , Fig. 4C is short

one legend wrt Fig. 6C and Fig. 4B is short a half-legend below the axis, so the b), c) and d) legend requirements above result, albeit the Examiner is not absolutely certain of what the missing Fig. 4C legend should exactly be since this in turn associates with how this figure is correctively re-drawn per the remaining c) issue supra. It would appear however by this same democracy that a corrected Fig. 4C would be the mirror image of Fig. 6C about axis 2f].

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 8 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Bradley et al (US6117082) insofar as Bradley et al in cols. 2 – 6 effectively teaches that a first fundamental f_0 and a second fundamental f_0/n or “fractional seed harmonic” may be both transmitted in order to preferentially obtain back a difference frequency therebetween by intermodulation effects with the harmonic in order to preferentially image a contrast agent in an intermediate band therebetween, including the setting of a phase differential of 180 degrees which would be understood by artisans to include a π radians difference in order to maximize the response, see col. 4 lines 33 - 60. The $f_0/3$ case for example means that one fundamental is triple the seed fundamental.

Claims 1 – 8 and 18 are further rejected under 35 U.S.C. 102(e) as being anticipated by Averkiou (US6440075) insofar as Averkiou teaches that for example by selecting fundamentals of 1.4 MHz and triplet 4.2 Mhz, difference frequency intermodulation products may be had which interact with the harmonic or subharmonic. Any of amplitude or phase or these frequency controls is exerted by transmitter 16 including a π or 180 degree offset in col. 11.

Mao et al (US6960169) uses spread spectrum coding to facilitate intermodulation effects. Loftman et al (US7074186) are cited as of general interest. Kawagishi et al (US6705996) extracts a difference frequency by attenuation of the fundamental.

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Hao et al (US6953434) incorporates first and second frequencies into a stepped chirp waveform pulse for contrast agent viewing enhancement.

Rielly et al (US7056290) combines a first fundamental f_0 and its harmonic $2f_0$ for forward transmission.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

12-09-06


Francis J. Jaworski
Primary Examiner